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(54) **IMAGE PROCESSING APPARATUS, IMAGE PROCESSING METHOD, AND COMPUTER-READABLE MEDIUM**

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***H04N 1/00*** (2006.01)
***H04N 1/32*** (2006.01)

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CPC .... ***H04N 1/00954*** (2013.01); *H04N 2201/3298* (2013.01); ***H04N 1/32358*** (2013.01); *H04N 2201/0094* (2013.01)

(58) **Field of Classification Search**
CPC ..... H04N 1/21
USPC ..... 358/1.1–1.9, 1.11–1.18
See application file for complete search history.

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(57) **ABSTRACT**

An image processing apparatus includes a storage and a controller. The storage stores an additional program having an interface for switching processing using first-choice hardware to processing using an alternative to the first-choice hardware depending on usage of the first-choice hardware. In the case where processing related to the additional program is executed, the controller executes the processing related to the additional program on image data by using the first-choice hardware or the alternative depending on the usage of the first-choice hardware.

**19 Claims, 6 Drawing Sheets**

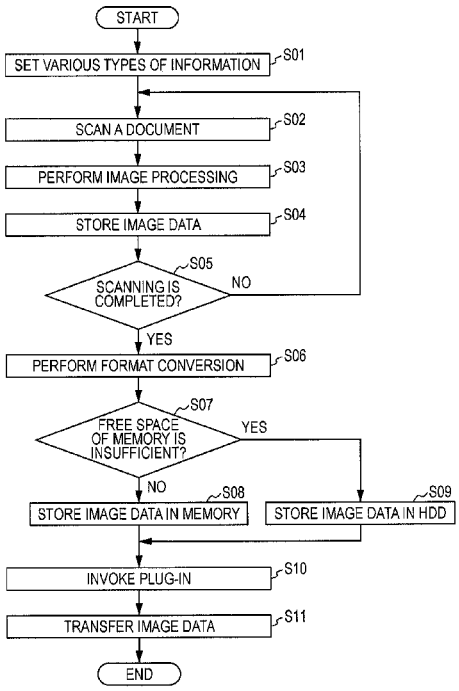


FIG. 1

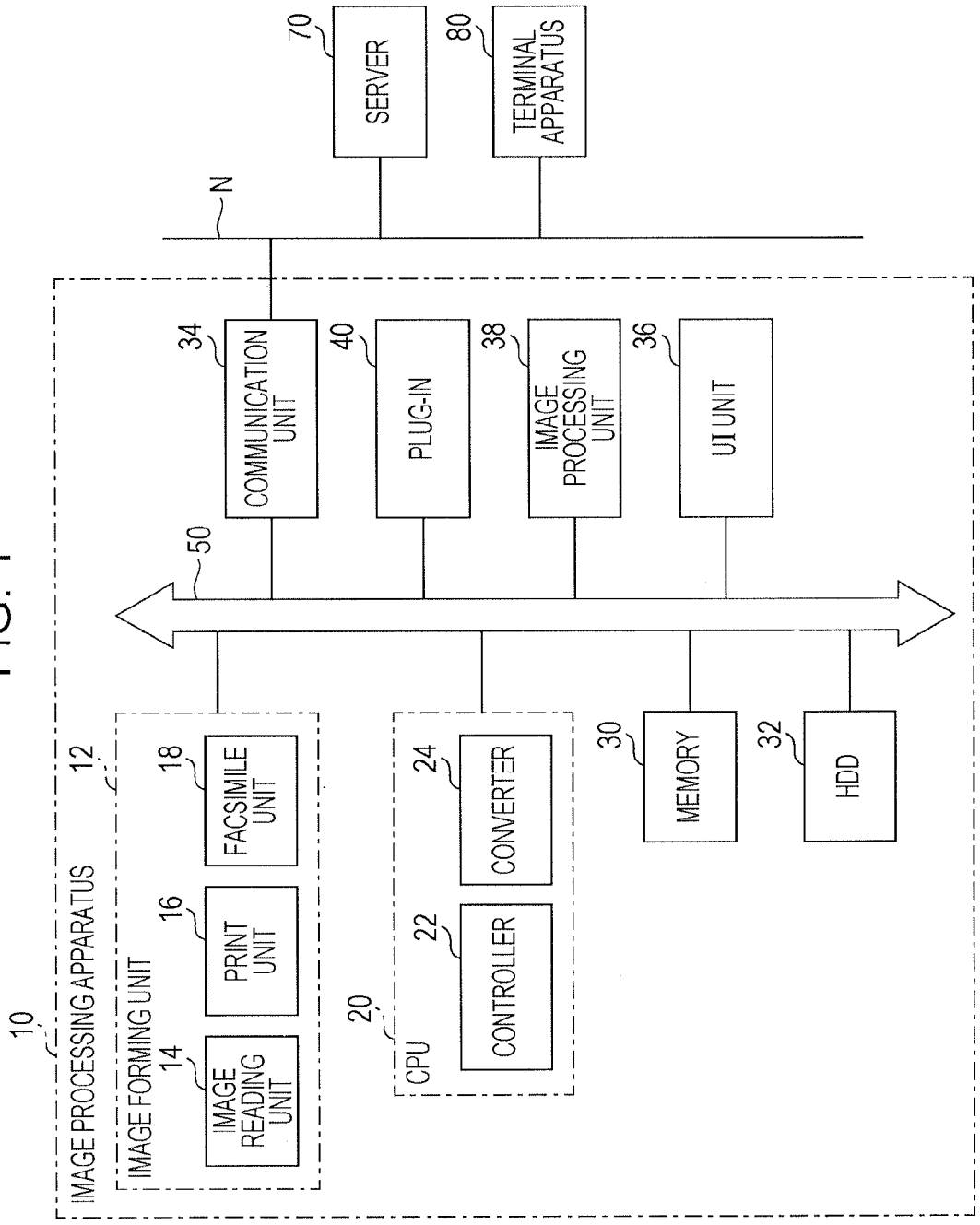

70
SERVER
80
TERMINAL APPARATUS
N
34
COMMUNICATION UNIT
40
PLUG-IN
38
IMAGE PROCESSING UNIT
36
UI UNIT
50
10
IMAGE PROCESSING APPARATUS
12
IMAGE FORMING UNIT
18
FACSIMILE UNIT
16
PRINT UNIT
14
IMAGE READING UNIT
20
CPU
24
CONVERTER
22
CONTROLLER
30
MEMORY
32
HDD

FIG. 2

```
interface transferable {
    int init();
    int sendfile();      ··· FUNCTION OF PASSING DATA BY USING FILE
    int sendbuffer();    ··· FUNCTION OF PASSING DATA BY USING MEMORY
    int end();
}
```

FIG. 3

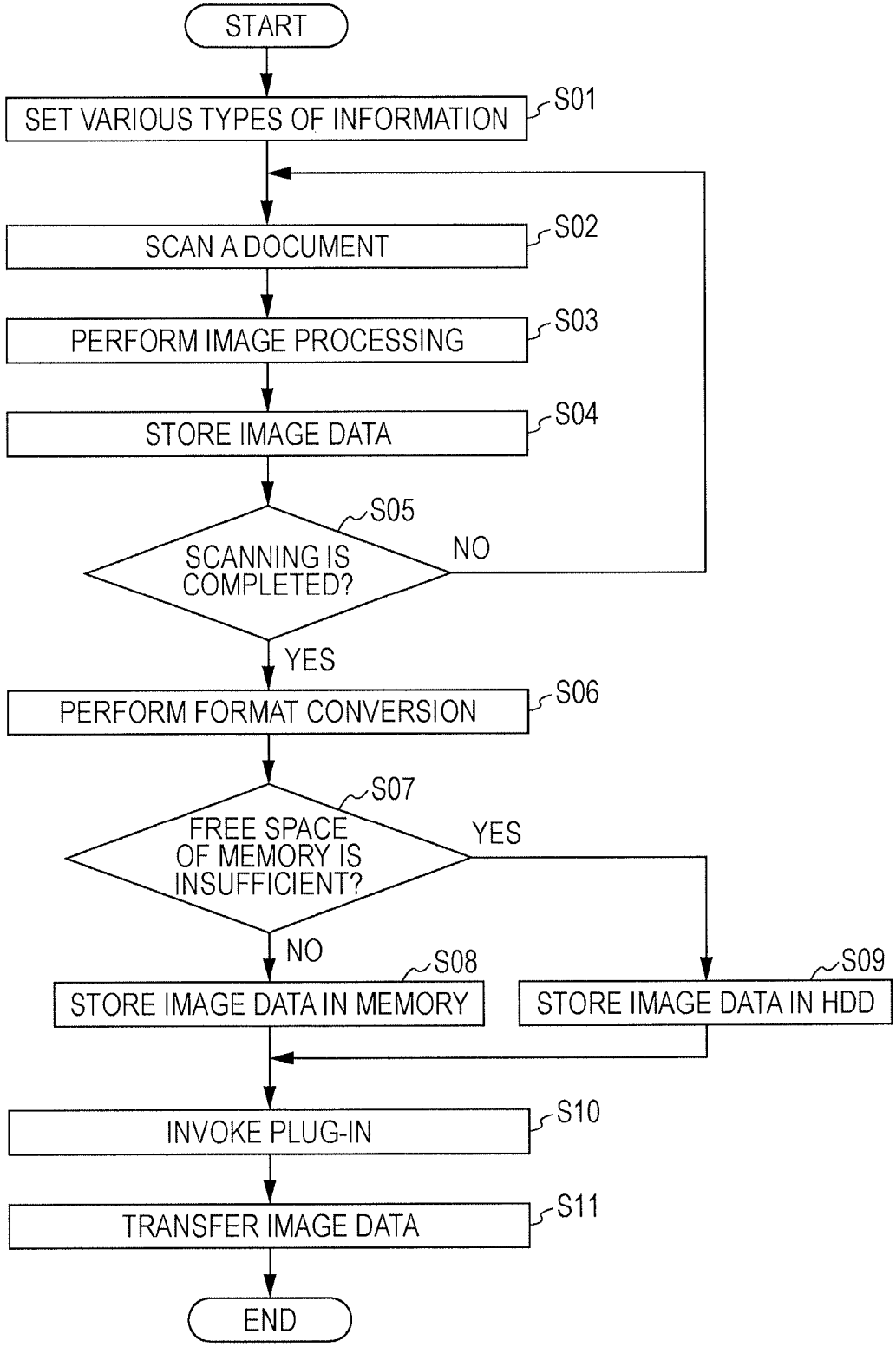

START
SET VARIOUS TYPES OF INFORMATION
S01
SCAN A DOCUMENT
S02
PERFORM IMAGE PROCESSING
S03
STORE IMAGE DATA
S04
S05
SCANNING IS COMPLETED?
NO
YES
PERFORM FORMAT CONVERSION
S06
S07
FREE SPACE OF MEMORY IS INSUFFICIENT?
YES
NO
S08
STORE IMAGE DATA IN MEMORY
S09
STORE IMAGE DATA IN HDD
INVOKE PLUG-IN
S10
TRANSFER IMAGE DATA
S11
END

FIG. 4

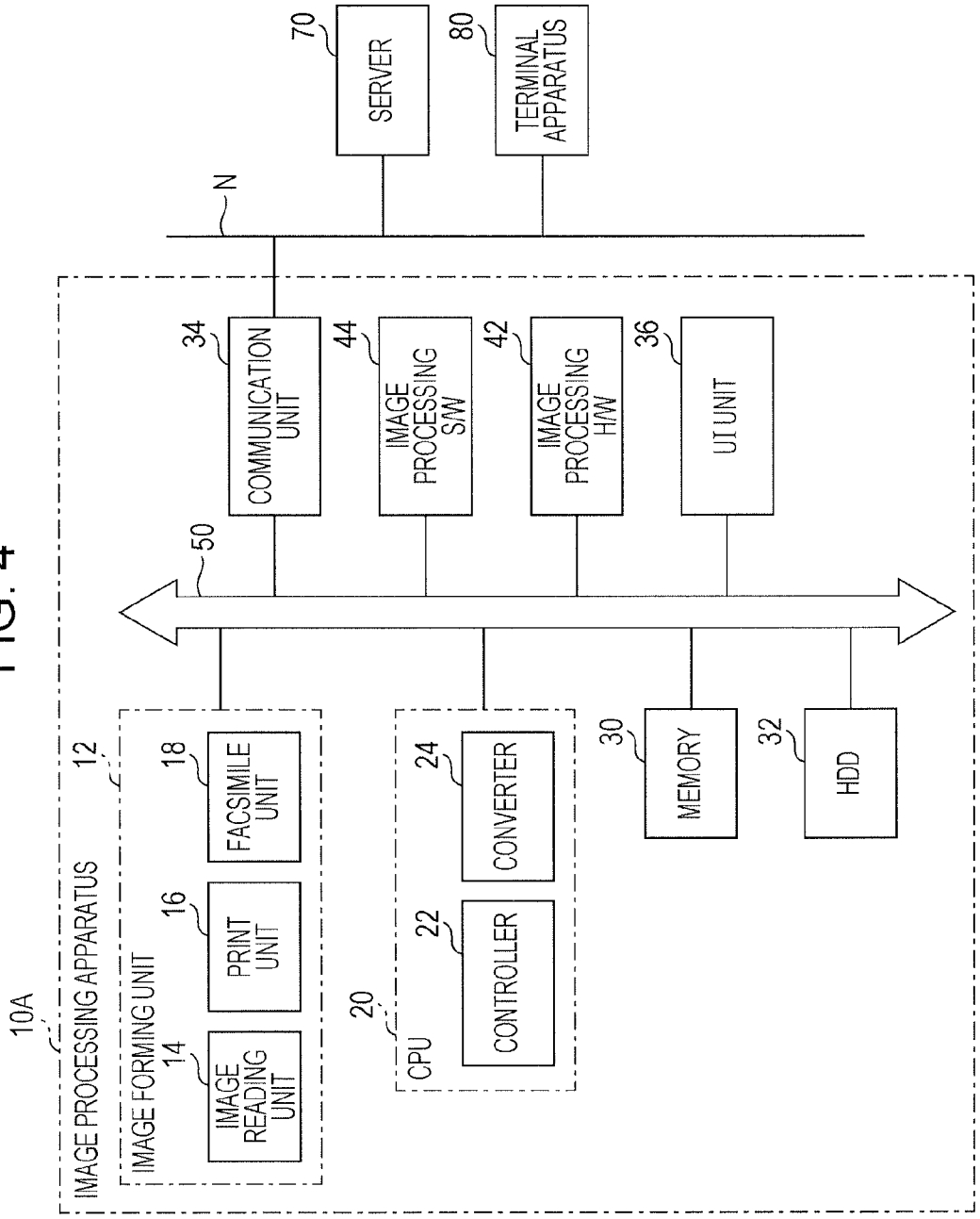
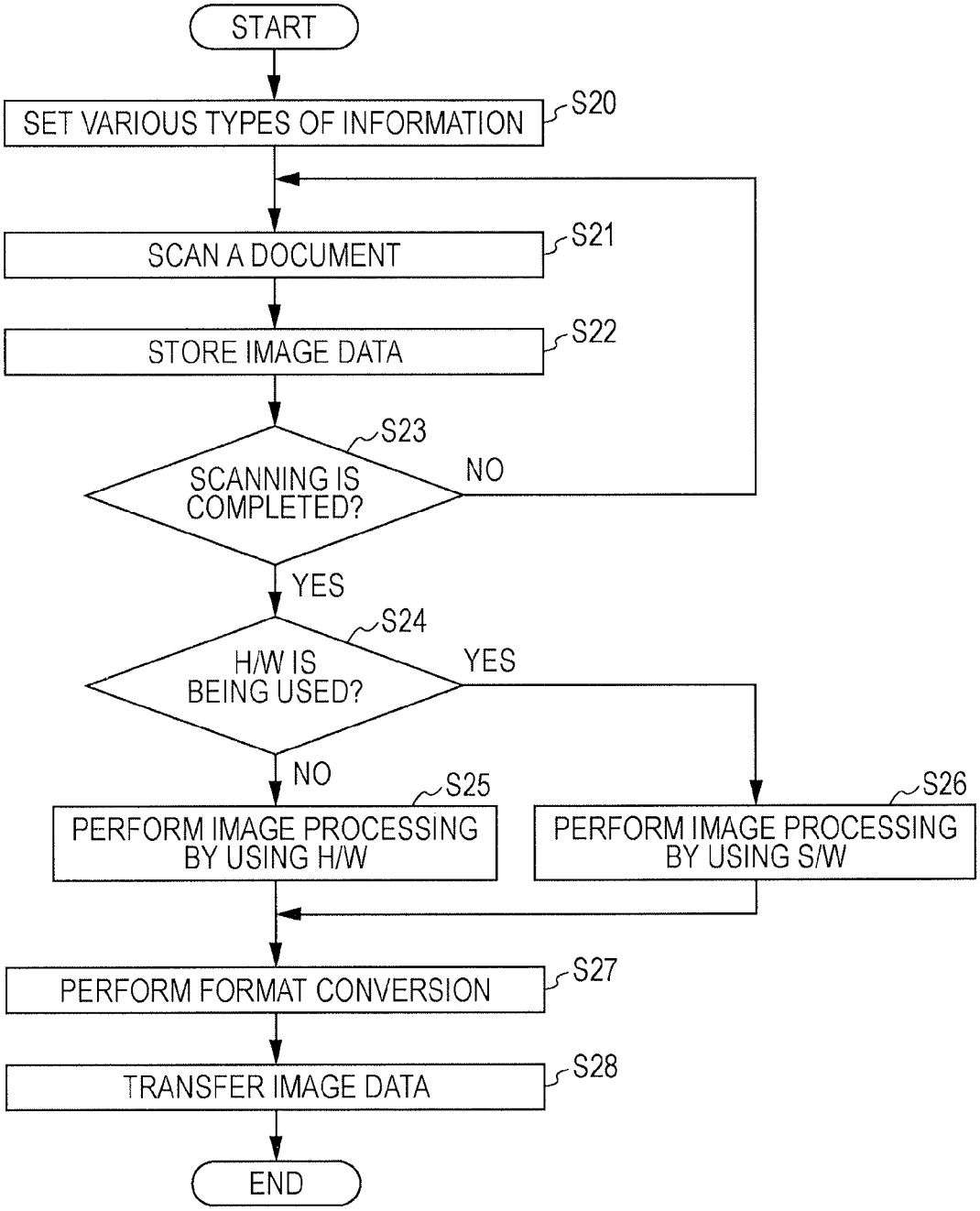

70
SERVER
80
TERMINAL APPARATUS
N
34
COMMUNICATION UNIT
44
IMAGE PROCESSING S/W
42
IMAGE PROCESSING H/W
36
UI UNIT
50
10A
IMAGE PROCESSING APPARATUS
12
IMAGE FORMING UNIT
18
FACSIMILE UNIT
16
PRINT UNIT
14
IMAGE READING UNIT
20
CPU
22
CONTROLLER
24
CONVERTER
30
MEMORY
32
HDD

FIG. 5

```
interface imageprocess {
    int init();
    int sw_process();    ··· FUNCTION OF PERFORMING IMAGE PROCESSING
                             THROUGH SOFTWARE
    int hw_process();    ··· FUNCTION OF PERFORMING IMAGE PROCESSING
                             THROUGH HARDWARE
    int end();
}
```

FIG. 6


START
SET VARIOUS TYPES OF INFORMATION
S20
SCAN A DOCUMENT
S21
STORE IMAGE DATA
S22
S23
SCANNING IS COMPLETED?
NO
YES
S24
H/W IS BEING USED?
YES
NO
S25
PERFORM IMAGE PROCESSING BY USING H/W
S26
PERFORM IMAGE PROCESSING BY USING S/W
PERFORM FORMAT CONVERSION
S27
TRANSFER IMAGE DATA
S28
END

# IMAGE PROCESSING APPARATUS, IMAGE PROCESSING METHOD, AND COMPUTER-READABLE MEDIUM

## CROSS-REFERENCE TO RELATED APPLICATIONS

This application is based on and claims priority under 35 USC 119 from Japanese Patent Application No. 2012-280069 filed Dec. 21, 2012.

## BACKGROUND

(i) Technical Field

The present invention relates to an image processing apparatus, an image processing method, and a computer-readable medium.

(ii) Related Art

In image processing apparatuses, programs related to image processing, such as programs related to a print function, programs related to a scanning function, programs related to a copy function, and programs related to a facsimile function, are installed in advance. Further, by installing programs, such as programs for image data transfer and programs for image data compression, as additional programs in image processing apparatuses, the image processing apparatuses may have optional functions. The programs added to image processing apparatuses may be called plug-ins.

## SUMMARY

According to an aspect of the present invention, there is provided an image processing apparatus including a storage and a controller. The storage stores an additional program having an interface for switching processing using first-choice hardware to processing using an alternative to the first-choice hardware depending on usage of the first-choice hardware. In the case where processing related to the additional program is executed, the controller executes the processing related to the additional program on image data by using the first-choice hardware or the alternative depending on the usage of the first-choice hardware.

## BRIEF DESCRIPTION OF THE DRAWINGS

Exemplary embodiments of the present invention will be described in detail based on the following figures, wherein:

FIG. **1** is a block diagram illustrating an exemplary image processing system according to a first exemplary embodiment of the present invention;

FIG. **2** is a diagram for describing an interface of a plug-in according to the first exemplary embodiment;

FIG. **3** is a flowchart of an exemplary operation of an image processing apparatus according to the first exemplary embodiment;

FIG. **4** is a block diagram illustrating an exemplary image processing system according to a second exemplary embodiment of the present invention;

FIG. **5** is a diagram for describing an interface of a plug-in according to the second exemplary embodiment; and

FIG. **6** is a flowchart of an exemplary operation of an image processing apparatus according to the second exemplary embodiment.

## DETAILED DESCRIPTION

First Exemplary Embodiment

FIG. **1** illustrates an exemplary image processing system according to a first exemplary embodiment of the present invention. The image processing system according to the first exemplary embodiment includes an image processing apparatus **10**, a server **70**, and a terminal apparatus **80**. The image processing apparatus **10**, the server **70**, and the terminal apparatus **80** are connected to each other via a communication path N such as a network. The server **70** is installed, for example, on a cloud. In the example in FIG. **1**, one server **70** and one terminal apparatus **80** are illustrated. However, multiple servers **70** and multiple terminal apparatuses **80** may be connected to the communication path N.

The image processing apparatus **10** is provided with a scanning function of scanning the image on a document and converting the scanned image into electronic image data. The image processing apparatus **10** may be also provided with at least one of image forming functions, such as a print function of printing received data, a copy function of copying the image on a document onto paper, and a facsimile function of transmitting an image by using a facsimile. The image processing apparatus **10** may be further provided with various functions, such as a function of downloading image data stored in the server **70** and a function of printing downloaded image data. However, the image processing apparatus **10** is not limited to these. For example, a scanner provided with no print functions may be included in the category of the image processing apparatus **10** according to the first exemplary embodiment.

For example, the image processing apparatus **10** includes an image forming unit **12**, a central processing unit (CPU) **20**, a memory **30**, a hard disk drive (HDD) **32**, a communication unit **34**, a user interface unit (UI unit) **36**, an image processing unit **38**, a plug-in **40**, and a bus **50**. The units of the image processing apparatus **10** are connected to the bus **50**.

For example, the image forming unit **12** includes an image reading unit **14**, a print unit **16**, and a facsimile unit **18**. The image reading unit **14** scans the image on a document so as to generate image data representing the image. The print unit **16** prints an image on paper. The facsimile unit **18** transmits an image by using a facsimile.

The CPU **20** controls operations of the units of the image processing apparatus **10**. The memory **30** is constituted by, for example, a random access memory (RAM), and stores, for example, various types of program, control data, and image data. The memory **30** has a data transfer rate faster than that of the HDD **32**. The HDD **32** stores, for example, various types of program, control data, and image data. For example, the CPU **20** executes the programs, thereby performing functions of the units of the image processing apparatus **10**.

The communication unit **34** is, for example, a network interface, and connects the image processing apparatus **10** to the communication path N, enabling data transmission to the server **70** and the terminal apparatus **80** and also enabling data reception from the server **70** and the terminal apparatus **80**.

The UI unit **36** is provided with, for example, an input device and a display, and receives inputs of various types of information from a user and displays a screen about image formation. For example, the UI unit **36** receives inputs of various types of parameter used when a document is scanned using the image reading unit **14**. In addition, the UI unit **36** receives various types of setting information used when image data generated through scanning is transferred to an external apparatus.

The image processing unit **38** subjects image data generated through scanning or image data received from an external apparatus to image processing, such as gamma correction, filtering, gradation processing, and compression. The image

processing unit **38** may be achieved by using image processing software, or may be achieved by using image-processing dedicated hardware.

The plug-in **40** is a set of programs added to the image processing apparatus **10**, and is stored in, for example, the memory **30** or the HDD **32**. The plug-in **40** is, for example, a program which is for extending the scanning function of the image processing apparatus **10** and which causes image data generated through scanning to be transferred to an external apparatus, such as the server **70** or the terminal apparatus **80**, via the communication path N. The plug-in **40** is installed in the image processing apparatus **10**, for example, through a recording medium, such as a compact disk (CD) or a digital versatile disk (DVD), or through the communication path N, and is stored in the memory **30** or the HDD **32**.

The plug-in **40** is described (implemented) by using, for example, a programming language such as Java™, and is provided (implemented) with interfaces for passing/receiving data. For example, the plug-in **40** has an interface for switching processing using the first-choice hardware to processing using an alternative depending on the usage of the first-choice hardware. FIG. **2** illustrates an exemplary interface of the plug-in **40**. For example, the plug-in **40** has an interface for passing/receiving data via the memory **30** and an interface for passing/receiving data via the HDD **32**. For example, the memory **30** corresponds to the first-choice hardware, and the HDD **32** corresponds to an alternative. In FIG. **2**, "sendfile( )" is a function of passing/receiving data via the HDD **32** by using the data as a file, whereas "sendbuffer( )" is a function of passing/receiving data via the memory **30**.

The image processing apparatus **10** includes a controller **22** and a converter **24**. When the controller **22** executes the plug-in **40**, the controller **22** uses the first-choice hardware or the alternative depending on the usage of the first-choice hardware so as to perform processing according to the plug-in **40** on image data. For example, the controller **22** stores image data generated through scanning in the memory **30** or the HDD **32** depending on the free space of the memory **30** corresponding to the first-choice hardware. Then, the controller **22** executes the plug-in **40** to transfer the image data stored in the memory **30** or the HDD **32** to an external apparatus. For example, when the data capacity required for transfer of the image data is available in the memory **30** (when the free space of the memory **30** is sufficient), the controller **22** transfers the image data via the memory **30** to an external apparatus. When the data capacity required for transfer of the image data is not available in the memory **30** (when the free space of the memory **30** is insufficient), the controller **22** transfers the image data via the HDD **32** to an external apparatus. More specifically, when the free space of the memory **30** is equal to or more than a predetermined threshold, the controller **22** stores image data generated through scanning in the memory **30**, and executes the plug-in **40** so as to transfer the image data stored in the memory **30** via the communication unit **34** and the communication path N to an external apparatus. When the free space of the memory **30** is less than the predetermined threshold, the controller **22** stores image data generated through scanning in the HDD **32**, and executes the plug-in **40** so as to transfer the image data stored in the HDD **32** via the communication unit **34** and the communication path N to an external apparatus. Even when the free space of the memory **30** is less than the amount of image data to be transferred, the controller **22** may gradually store the image data in the memory **30**, and at the same time, may gradually transfer the image data stored in the memory **30** to an external apparatus.

The converter **24** converts the format of image data generated through scanning into any format, such as Portable Document Format (PDF), XML Paper Specification (XPS), or Joint Photographic Experts Group (JPEG). For example, a user may specify the format type by using the UI unit **36**.

A process of transferring image data generated through scanning will be described with reference to the flowchart in FIG. **3**.

A user uses the UI unit **36** to input information, such as the image format type and the destination of transfer of image data, and transmits an instruction to start scanning (in step **S01**). This causes the image reading unit **14** to scan a document (in step **S02**). For example, the image reading unit **14** scans a document constituted by multiple pages, and generates image data for each page. The image processing unit **38** performs image processing on the image data generated through scanning (in step **S03**). The CPU **20** adds a file name to the image data obtained through image processing, and temporarily stores the image data in the HDD **32** (in step **S04**). If the image reading unit **14** scans all pages (YES in step **S05**), the scanning is completed. Then, the converter **24** reads out the image data from the HDD **32**, and converts the format of the read-out image data into the format specified by the user (in step **S06**). If pages which have not been scanned are left (NO in step **S05**), steps **S02** to **S04** are performed on the pages which have not been scanned.

When all of the pages are scanned and the format of the image data is converted, the controller **22** checks the free space of the memory **30** (in step **S07**). If the free space of the memory **30** is sufficient (NO in step **S07**), the controller **22** stores the image data whose format has been converted in the memory **30** (in step **S08**). For example, if the free space of the memory **30** is equal to or more than the predetermined threshold, the controller **22** stores the image data in the memory **30**. If the free space of the memory **30** is insufficient (YES in step **S07**), the controller **22** stores the image data whose format has been converted in the HDD **32** (in step **S09**). For example, if the free space of the memory **30** is less than the predetermined threshold, the controller **22** stores the image data in the HDD **32**.

The controller **22** invokes the plug-in **40** (in step **S10**). Description will be made with reference to FIG. **2**. If the free space of the memory **30** is sufficient, the controller **22** invokes the functions of plug-in **40**, which are init( ), sendbuffer( ), and end( ), in this sequence. Thus, the controller **22** executes the plug-in **40**, causing the image data stored in the memory **30** to be transferred via the communication unit **34** and the communication path N to the external apparatus specified by the user (in step **S11**). If the free space of the memory **30** is insufficient, the controller **22** invokes the functions of the plug-in **40**, which are init( ), sendfile( ), and end( ), in this sequence. Thus, the controller **22** executes the plug-in **40**, causing the image data stored in the HDD **32** to be transferred via the communication unit **34** and the communication path N to the external apparatus specified by the user (in step **S11**).

As described above, in the image processing apparatus **10** according to the first exemplary embodiment, in the case where the plug-in **40** is executed to transfer image data to an external apparatus, even when the free space of the memory **30** which is the first-choice hardware to be used for the transfer is insufficient, the HDD **32** serving as an alternative is used to perform the transfer, whereby the transfer is smoothly performed. If insufficient free space of the memory **30** causes the transfer to wait, the processing including the transfer may be delayed, causing a user to wait. In contrast, the image processing apparatus **10** according to the first exemplary embodiment achieves smooth transfer.

For example, the larger the number of plug-ins added to the image processing apparatus **10** in order to extend the func-

tions of the image processing apparatus **10** is, the smaller the free space of the memory **30** is. As a result, the free space of the memory **30** may be insufficient when image data is to be transferred. Typically, a more highly functional plug-in has a tendency to increase a consumption of the memory **30**. Therefore, the free space of the memory **30** may be insufficient when image data is to be transferred. The image processing apparatus **10** according to the first exemplary embodiment uses the HDD **32** serving as an alternative to transfer image data, achieving smooth transfer even when the free space of the memory **30** is insufficient.

Alternatively, a limit may be set in advance for the memory consumption caused by a plug-in, and a plug-in which operates within the limit may be developed and installed in the image processing apparatus **10**. However, in addition to plug-ins developed by the manufacturer of the image processing apparatus **10**, plug-ins developed by other software developers may be installed and used in the image processing apparatus **10**. In this case, plug-ins which consume the memory to a degree exceeding the predetermined limit may be installed in the image processing apparatus **10**, causing the free space of the memory **30** to become insufficient. Even in this case, the image processing apparatus **10** according to the first exemplary embodiment uses the HDD **32** serving as an alternative so as to transfer image data, achieving smooth transfer.

The controller **22** may transfer image data via the memory **30** or the HDD **32** to an external apparatus depending on a user logging in the image processing apparatus **10**. For example, priority as user authority may be given to users in advance. When a user having high priority is logging in the image processing apparatus **10**, the controller **22** may transfer image data via the memory **30** to an external apparatus. When a user having low priority is logging in the image processing apparatus **10**, the controller **22** may transfer image data via the HDD **32** to an external apparatus. Thus, image data is transferred by changing the transfer rate depending on a user. For example, when a user having high priority is logging in, image data is transferred at a rate higher than that used when a user having low priority is logging in. Thus, the memory **30** may be efficiently used by changing hardware used for the transfer depending on user authority.

For example, when a user logging in the image processing apparatus **10** has administrator authority, image data may be transferred via the memory **30**. When a user logging in the image processing apparatus **10** does not have administrator authority, image data may be transferred via the HDD **32**. In this case, a user uses the UI unit **36** to input authentication information, such as a user ID and a password, and logs in the image processing apparatus **10**. The controller **22** performs authentication on the basis of the authentication information which is input from the UI unit **36**. When the login user is authenticated as an administrator, image data is transferred via the memory **30** to an external apparatus. When a regular user having no administrator authority is logging in the image processing apparatus **10**, the controller **22** transfers image data via the HDD **32** to an external apparatus. Thus, when an administrator is logging in, image data is transferred at a rate higher than that used for other users.

When the free space of the memory **30** is insufficient and the HDD **32** serving as an alternative is not included in the image processing apparatus **10**, the controller **22** may cause the transfer to wait until the free space of the memory **30** becomes sufficient. When the free space of the memory **30** becomes sufficient, image data may be transferred via the memory **30** to an external apparatus. Thus, even in the case where the plug-in **40** which operates on the precondition that switching to an alternative is performed in response to the usage of the first-choice hardware is installed in the image processing apparatus **10**, when the HDD **32** serving as an alternative is not included in the image processing apparatus **10**, image data is transferred via the memory **30** serving as the first-choice hardware.

When the free space of the memory **30** is insufficient and the image processing apparatus **10** does not include the HDD **32** serving as an alternative, the controller **22** may stop scanning and transfer of image data, preventing delay of processing.

Second Exemplary Embodiment

An image processing apparatus according to a second exemplary embodiment will be described. FIG. **4** illustrates an exemplary image processing system according to the second exemplary embodiment. Similarly to the first exemplary embodiment, an image processing apparatus **10**A according to the second exemplary embodiment is connected to the server **70** and the terminal apparatus **80** via the communication path N. The image processing apparatus **10**A includes an image processing hardware (H/W) **42** instead of the image processing unit **38**, and an image processing software (S/W) **44** instead of the plug-in **40**. Features different from those in the first exemplary embodiment will be described below.

The image processing H/W **42** is dedicated hardware for subjecting image data generated through scanning or image data received from an external apparatus to image processing, such as gamma correction, filtering, gradation processing, and compression.

The image processing S/W **44** is a set of programs (plug-in) added to the image processing apparatus **10**A, and is stored in, for example, the memory **30** or the HDD **32**. The image processing S/W **44** is software for performing the same processing operations of image processing as at least some operations of the image processing performed by the image processing H/W **42**. For example, the CPU **20** executes the image processing S/W **44**, causing image data to be subjected to image processing, such as gamma correction, filtering, gradation processing, and compression. The image processing S/W **44** serving as a plug-in has an interface for switching processing using the first-choice hardware to processing using an alternative depending on the usage of the first-choice hardware. FIG. **5** illustrates an exemplary interface of the image processing S/W **44**. For example, the image processing S/W **44** has an interface for performing image processing by using hardware, and an interface for performing image processing by using software. For example, the image processing H/W **42** corresponds to the first-choice hardware, and the image processing S/W **44** corresponds to software serving as an alternative. The function "sw_process( )" in FIG. **5** is a function of performing image processing by using software (i.e., the image processing S/W **44**). The function "hw_process( )" is a function of performing image processing by using hardware (i.e., the image processing H/W **42**).

The image processing H/W **42** is image-processing dedicated hardware. Therefore, the processing speed of the image processing H/W **42** is faster than that of the image processing S/W **44** which is software.

When the controller **22** performs image processing on image data, the controller **22** uses the image processing H/W **42** or the image processing S/W **44** depending on the usage of the image processing H/W **42** corresponding to the first-choice hardware. For example, when the image processing H/W **42** is not being used, the controller **22** controls the image processing H/W **42** so as to perform image processing on image data. When the image processing H/W **42** is being

used, the controller **22** executes the image processing S/W **44** serving as a plug-in so as to perform image processing on image data.

A process of performing image processing on image data generated through scanning will be described with reference to the flowchart in FIG. **6**.

A user uses the UI unit **36** to input information, such as the image format type and the destination of transfer of image data, and transmits an instruction to start scanning (in step S**20**). This causes the image reading unit **14** to scan a document (in step S**21**). The CPU **20** adds a file name to the image data generated through scanning, and temporarily stores the image data in the HDD **32** (in step S**22**). The image data may be stored in the HDD **32** after the image data is subjected to predetermined image processing. If the image reading unit **14** has scanned all pages in a document (YES in step S**23**), the scanning is completed. If pages which have not been scanned are left (NO in step S**23**), steps S**21** to S**23** are performed on the pages which have not been scanned.

If all of the pages have been scanned, the controller **22** checks the usage of the image processing H/W **42** (in step S**24**). If the image processing H/W **42** is not being used (NO in step S**24**), the controller **22** invokes the interface for performing image processing by using hardware, and causes the image processing H/W **42** to perform image processing. Thus, the image processing H/W **42** performs predetermined image processing on the image data generated through scanning (in step S**25**). If the image processing H/W **42** is being used (YES in step S**24**), the controller **22** invokes the interface for performing image processing by using software. Thus, the CPU **20** executes the image processing S/W **44** serving as a plug-in, causing the image data generated through scanning to be subjected to image processing (in step S**26**).

The converter **24** converts the format of the image data which has been subjected to image processing into the format specified by the user (in step S**27**). Then, the controller **22** transfers the image data via the communication unit **34** and the communication path N to the external apparatus specified by the user (in step S**28**).

As described above, in the image processing apparatus **10**A according to the second exemplary embodiment, when image processing is to be performed and even when the image processing H/W **42** which is the first-choice hardware used in the image processing is being used, the image processing S/W **44** serving as an alternative is used to perform image processing, achieving smooth image processing. If the image processing is caused to wait while the image processing H/W **42** is being used, the processing including the image processing may be delayed, causing a user to wait. In contrast, the image processing apparatus **10**A according to the second exemplary embodiment achieves smooth image processing.

When the image processing H/W **42** is being used, the controller **22** may cause the image processing to wait until the use of the image processing H/W **42** is finished. After the use of the image processing H/W **42** is finished, the controller **22** may use the image processing H/W **42** to perform image processing on the image data generated through scanning. Thus, even in the case where the image processing S/W **44** which operates on the precondition that switching to an alternative is performed in response to the usage of the first-choice hardware is installed in the image processing apparatus **10**A, image processing is performed using the image processing H/W **42**. For example, when a time period for execution of processing which is caused to wait until use of the image processing H/W **42** is finished and which then performs image processing by using the image processing H/W **42** is less than that for execution of processing using the image processing S/W **44**, the image processing H/W **42** may be used to perform image processing. Alternatively, when the amount of image data is equal to or more than a predetermined threshold, the image processing may be caused to wait until use of the image processing H/W **42** is finished, and image processing may be performed using the image processing H/W **42**, not using the image processing S/W **44**.

When the image processing H/W **42** is being used, the controller **22** may stop image processing, preventing the processing from being delayed.

Each of the functions of the controller **22** and the converter **24** included in the image processing apparatuses **10** and **10**A described above is achieved typically with the CPU **20** executing programs stored in a storage such as the memory **30**. However, some of the functions may be achieved through hardware. The above-described programs are stored in the storage through a recording medium, such as a CD or a DVD, or through a communication path such as a network. The above-described programs may be stored in advance in the storage. The programs stored in the storage are read out into a memory and executed by the CPU **20**, achieving the functions of the above-described units.

The foregoing description of the exemplary embodiments of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in the art. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, thereby enabling others skilled in the art to understand the invention for various embodiments and with the various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims and their equivalents.

What is claimed is:

**1**. An image processing apparatus comprising:

a storage configured to store an additional program having an interface configured to switch processing using first-choice hardware to processing using an alternative to the first-choice hardware depending on usage of the first-choice hardware; and

a controller that, in response to processing related to the additional program being executed, is configured to execute the processing related to the additional program on image data by using the first-choice hardware or the alternative depending on the usage of the first-choice hardware,

wherein the addition, program is a program configured to transfer the image data to an external apparatus,

wherein the first-choice hardware is a first storage, and the alternative is a second storage having a data transfer rate that is lower than a data transfer rate of the first storage, and

wherein in response to the first storage having a sufficient available data capacity to transfer the image data, the controller is configured to store the image data in the first storage, and execute the additional program so as to transfer the image data stored in the first storage to the external apparatus, and

wherein, in response to the first storage not having the sufficient available data capacity to transfer the image data, the controller is configured to store the image data in the second storage, and execute the additional program so as to transfer the image data stored in the second storage to the external apparatus.

2. The image processing apparatus according to claim 1, further comprising:

an image reading unit configured to generate the image data by scanning a document.

3. The image processing apparatus according to claim 1, wherein the controller is further configured to transfer the image data to the external apparatus by using the first storage or the second storage depending a priority level associated with a user of the image processing apparatus.

4. The image processing apparatus according to claim 1, wherein, in response to the first storage not having the sufficient available data capacity transfer the image data and the image processing apparatus not including the second storage serving as the alternative, the controller is configured to wait until the sufficient available data capacity exists in the first storage, and use the first storage to transfer the image data to the external apparatus after the sufficient available data capacity exists in the first storage.

5. The image processing apparatus according to claim 3, wherein, in response to the first storage not having the sufficient available data capacity to transfer the image data and the image processing apparatus not including the second storage serving as the alternative, the controller is configured to wait until the sufficient available data capacity exists in the first storage, and use the first storage to transfer the image data to the external apparatus after the sufficient available data capacity exists in the first storage.

6. The image processing apparatus according to claim 1, wherein, in response to the first storage not having the sufficient available data capacity to transfer the image data and the image processing apparatus not including the second storage serving as the alternative, the controller is configured to stop the scanning and the transfer.

7. The image processing apparatus according to claim 3, wherein, in response to the first storage not having the sufficient available data capacity to transfer the image data and the image processing apparatus not including the second storage serving as the alternative, the controller is configured to stop the scanning and the transfer.

8. The image processing apparatus according to claim 1, wherein the first storage is a memory, and the second storage is a hard disk drive.

9. The image processing apparatus according to claim 3, wherein the first storage is a memory, and the second storage is a hard disk drive.

10. The image processing apparatus according to claim 4, wherein the first storage is a memory, and the second storage is a hard disk drive.

11. The image processing apparatus according to claim 5, wherein the first storage is a memory, and the second storage is a hard disk drive.

12. The image processing apparatus according to claim 6, wherein the first storage is a memory, and the second storage is a hard disk drive.

13. The image processing apparatus according to claim 7, wherein the first storage is a memory, and the second storage is a hard disk drive.

14. An image processing apparatus comprising:

a storage configured to store an additional program having an interface configured to switch processing using first-choice hardware to processing using an alternative to the first-choice hardware depending on usage of the first-choice hardware; and

a controller that, in response to processing related to the additional program being executed, is configured to execute the processing related to the additional program on image data by using the first-choice hardware or the alternative depending on the usage of the first-choice hardware,

wherein the additional program is an image processing program configured to perform predetermined image processing on the image data,

wherein the first-choice hardware is image-processing dedicated hardware configured to perform the predetermined image processing on the image data, and

wherein, in response to the image-processing dedicated hardware not being busy, the controller is configured to perform the predetermined image processing on the image data by using the image-processing dedicated hardware, and

wherein, in response to the image-processing dedicated hardware being busy, the controller is configured to perform the predetermined image processing on the image data by executing the image processing program.

15. A non-transitory computer readable medium storing a program causing a computer to execute a process, the program having an interface configured to switch processing using first-choice hardware to processing using an alternative to the first-choice hardware depending on usage of the first-choice hardware, the process comprising:

in response to processing related to an additional program added to an image processing apparatus being executed, switching a unit to be used in the execution of the processing related to the additional program to the first-choice hardware or the alternative depending on the usage of the first-choice hardware; and

using the first-choice hardware or the alternative to execute the processing related to the additional program on image data, the first-choice hardware or the alternative being the unit to which the switching has been performed,

wherein the additional program added to the image processing apparatus is a program configured transfer the image data to an external apparatus,

wherein the first-choice hardware is a first storage, and the alternative is a second storage having a data transfer ate that is lower than a data transfer rate of the first storage, and

wherein, in response to the first storage having a sufficient available data capacity to transfer the image data, the image data is stored in the first storage, and the additional program is executed on as to transfer the image data stored in the first storage to the external apparatus, and

wherein, in response to the first storage not having the sufficient available data capacity to transfer the image data, the image data is stored in the second storage, and the additional program is executed so as to transfer the image data stored in the second storage to the external apparatus.

16. An image processing method using a program having an interface configured to switch processing using first-choice hardware to processing using an alternative to the first-choice hardware depending on usage of the first-choice hardware, the method comprising:

in response to processing related to an additional program added to an image processing apparatus being executed, switching a unit to be used in the execution of the processing related to the additional program to the first-

choice hardware or the alternative depending on the usage of the first-choice hardware; and

using the first-choice hardware or the alternative to execute the processing related to the additional program on image data, the first-choice hardware or the alternative being the unit to which the switching has been performed,

wherein the additional program added to the image processing apparatus is a program configured to transfer the image data to an external apparatus,

wherein the first-choice hardware is a first storage, and the alternative is a second storage having a data transfer rate that is lower than a data transfer rate of the first storage, and

wherein, in response to the first storage having a sufficient available data capacity to transfer the image data, the image data is stored in the first storage and the additional program is executed on as to transfer the image data stored in the first storage to the external apparatus, and

wherein, in response to the first storage not having the sufficient available data capacity to transfer the image data, the i data is stored in the second storage, and the additional program is executed so as to transfer the image data stored in the second storage to the external apparatus.

**17**. An image processing apparatus comprising:

a storage configured to store an additional program having an interface configured to switch processing using first-choice hardware to processing using an alternative to the first-choice hardware depending on usage of the first-choice hardware; and

a controller that, in response to processing related to the additional program being executed, is configured to execute the processing related to the additional program on image data by using the first-choice hardware or the alternative depending on the usage of the first-choice hardware,

wherein the first-choice hardware is a first storage, and the alternative is a second storage having a data transfer rate that is lower than a data transfer rate of the first storage, and

wherein, in response to the first storage having a sufficient available data capacity to process the image data, the controller is configured to store the image data in the first storage, and execute the additional program so as to process the image data stored in the first storage to the external apparatus, and

wherein, in response to the first storage not having the sufficient available data capacity to process the image data, the controller is configured to store the image data in the second storage, and execute the additional program so as to process the image data stored in the second storage to the external apparatus.

**18**. A non-transitory computer readable medium storing a program causing a computer to execute a process, the program having an interface configured to switch processing using first-choice hardware to processing using an alternative to the first-choice hardware depending on usage of the first-choice hardware, the process comprising:

in response to processing related to an additional program added to an image processing apparatus being executed, switching a unit to be used in the execution of the processing related to the additional program to the first-choice hardware or the alternative depending on the usage of the first-choice hardware; and

using the first-choice hardware or the alternative to execute the processing related to the additional program on image data, the first-choice hardware or the alternative being the unit to which the switching has been performed,

wherein the first-choice hardware is a first storage, and the alternative is a second storage having a data transfer rate that is lower than a data transfer rate of the first storage, and

wherein, in response to the first storage having a sufficient available data capacity to process the image data, the image data is stored in the first storage, and the additional program is executed so as to process the image data stored in the first storage to the external apparatus, and

wherein, in response to the first storage not having the sufficient available data capacity to process the image data, the image data is stored in the second storage, and the additional program is executed so as to process the image data stored in the second storage to the external apparatus.

**19**. An image processing method using a program having an interface configured to switch processing using first-choice hardware to processing using an alternative to the first-choice hardware depending on usage of the first-choice hardware, the method comprising:

in response to processing related to an additional program added to an image processing apparatus being executed, switching a unit to be used in the execution of the processing related to the additional program to the first-choice hardware or the alternative depending on the usage of the first-choice hardware; and

using the first-choice hardware or the alternative to execute the processing related to the additional program on image data, the first-choice hardware or the alternative being the unit to which the switching has been performed,

wherein the first-choice hardware is a first storage, and the alternative is a second storage having a data transfer rate that is lower than a data transfer rate of the first storage, and

wherein, in response to the first storage having a sufficient available data capacity to process the image data, the image data is stored in the first storage, and the additional program is executed so as to process the image data stored in the first storage to the external apparatus, and

wherein, in response to the first storage not having the sufficient available data capacity to process the image data, the image data is stored in the second storage, and the additional program is executed so as to process the image data stored in the second storage to the external apparatus.

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